

1. Net area of Building	123,000 sq. ft.
2. Site, Design, Engineering, Supervision, etc.	\$ 685,000
3. Estimated Improvement Cost	\$3,693,000
4. Annual Rental of Space Comparable to New Building	\$ 500,000
5. Estimated Number of Personnel to be Housed	348
6. Economically Useful Life of Building	50 yrs.

II. Cost Inclusions

A. Construction

1. Site, Design, Engineering, etc.	\$ 685,000	685,000
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There is no discounting involved in this cost and consequently, the estimated cost is used. In the event that the site is expected to be acquired by exchange or use of a Government-owned site, the fair market value of the site should be used.

2. Improvement

Again no discounting is involved and the present value is the estimated cost.

3. <u>Maintenance and Operation</u>	\$3,475,938
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This total annual cost is computed by multiplying \$1.43 x net area of the building (123,000 sq. ft.). This yields \$175,890 which when multiplied by Figure I in Exhibit A (19.7620) will equal \$3,475,938 present value of a stream of \$175,890 payments in each of 50 years (economically useful life of building).

4. <u>Repairs and Improvements</u>	\$ 784,380
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This cost is assumed to escalate over the economically useful life of the building in the following manner:

<u>Range of Years</u>	<u>Cost per sq. ft.</u>
1 - 10	\$.10
11 - 20	.30

4. Repairs and Improvements (Cont'd)

<u>Range of Years</u>	<u>Cost per sq. ft.</u>
21-40	\$.50
41-50	1.00 1.20

The present value factor to be used for years 1 to 10 is Figure II in Exhibit A. To obtain the factor for the second period (years 10-20) Figure III must be reduced by Figure II yielding 5.0952. Similarly, the third period is obtained by subtracting Figure III from Figure IV yielding 5.3936. The fourth period is derived by subtracting Figure IV from Figure I yielding 1.3604. Therefore, the present value of the cost per sq. ft. is arrived at by multiplying these factors by the unit cost: $4\frac{1}{2}$

<u>5$\frac{1}{2}$</u>	<u>7.5376</u>	<u>$\times .10$</u>	<u>7.5376</u>	<u>$=$</u>	<u>.79127</u>	<u>10</u>
<u>4.4127</u>	<u>$\times .30$</u>	<u>1.32381</u>	<u>$=$</u>	<u>1.52856</u>	<u>20</u>	
<u>4.0958.50</u>	<u>$\times .50$</u>	<u>2.04750</u>	<u>$=$</u>	<u>2.69682</u>	<u>40</u>	
<u>.8854</u>	<u>$\times 1.00$</u>	<u>1.20</u>	<u>$.88540$</u>	<u>$=$</u>	<u>1.63248</u>	<u>50</u>
					<u>1.36042</u>	
			<u>5.09527</u>		<u>6.64913</u>	<u>6.37707</u>

The sum of these unit costs when multiplied by the net sq. ft. will yield the present value of the stream of R&I costs for the 50-year period. This factor then (6.377) can be used when the economically useful life is 50 years, the R&I costs are scheduled as above and the discount rate used is 4 1/2%.

5. Impacted Area Payment \$ 196,474

These payments are used to compute the cost to the Federal Government in compensating the local community for taxes foregone as a result of Government ownership. These payments are estimated as being equal to \$200 per child, with an average of one child per 7 employees or \$28.57 per employee. Number of Employees X Unit Payment X Present value factor for a 50-year stream of equal payments (Fig. I).

$$348 \times 28.57 \times 19.7620$$

TOTAL \$8,834,792

B. Leasing

Only one cost is pertinent for the leasing alternative, i.e., the annual comparable rental on a fully serviced basis. To determine the present value of a stream of equal payments over 50 years multiply Fig. I X the annual rental (\$500,000). Therefore, in this case it is shown that the construction alternative is 1,046,000 present-value dollars cheaper then the leasing alternative.

TOTAL \$9,881,000

III. The difference between the cost of leasing and the cost of construction divided by the net assignable square feet in the project will produce a number which can be compared with other numbers to determine the relative cost advantage of one project over another project.

KING FUND
periodic deposit
will grow to \$1
at future date.

PRESENT WORTH
OF 1
What \$1 due in the
future is worth
today.

PRESENT WORTH
OF 1 PER PERIOD
What \$1 payable
periodically is
worth today.

PARTIAL PAYMENT
Annuity worth \$1 today.
Periodic payment
necessary to pay off a
loan of \$1.

P
E
R
I
O
D
S

RATE
4 1/2%

.045
per period

100 000 0000
188 997 5550
118 773 3601
133 743 6479
.82 791 6395

.956 937 7990
.915 729 9512
.876 296 6041
.838 561 3436
.802 451 0465

.956 937 7990
1.872 667 7503
2.748 964 3643
3.587 525 6979
4.409 796 7644

1.045 000 0000
.533 997 5550
.363 773 3601
.278 743 6479
.227 791 6395

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.48 878 3875
24 701 4680
.06 609 6533
92 574 4700
.81 378 8217

.767 895 7363
.734 828 4571
.703 185 1270
.672 904 4277
.645 927 6620

5.157 872 4627
5.092 700 9404
6.595 806 0674
7.268 792 8951
7.912 718 1771

.193 878 3875
.169 701 4680
.151 609 6533
.137 574 4700
.126 378 8217

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172 246 1817
164 666 1866
158 275 3526
152 820 3160
148 113 8081

.616 198 7388
.589 663 8649
.564 271 6410
.539 972 8622
.516 720 4423

6.528 916 9159
9.118 580 7000
9.682 852 4218
10.222 825 2840
10.739 545 7263

.117 248 1817
.109 666 1866
.103 275 3526
.097 820 3160
.093 113 8081

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144 015 3694
140 417 5833
137 236 8975
134 407 3443
131 876 1443

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.458 800 3688
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.411 692 8597

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12.159 991 8034
12.593 299 6218
13.007 936 4515

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.085 417 5833
.082 236 8975
.079 407 3443
.076 876 1443

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129 600 5669
127 545 6463
125 602 4934
123 907 0291
122 439 0290

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.379 700 8057
.363 350 1298
.347 703 4735
.332 730 6967

13.404 723 1770
13.706 424 7627
14.147 774 8925
14.495 470 3660
14.828 208 9627

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.072 545 6463
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119 719 4616
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116 391 5429

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15.742 873 5126
16.021 888 5288
16.208 888 5443

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.064 719 4616
.063 520 8051
.062 414 6147
.061 391 5429

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113 744 5201
112 981 9119
112 270 4476

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.214 254 4419

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16.708 890 8627
17.022 862 6095
17.246 757 9613
17.461 012 4031

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.059 563 1962
.058 744 5201
.057 981 9119
.057 270 4476

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110 401 6920
109 855 6712
109 343 1466

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.171 928 7011

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18.049 990 2266
18.229 853 7192
18.401 584 4203

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.055 984 0206
.055 401 6920
.054 855 4712
.054 343 1466

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107 982 3492
107 580 7056
107 202 0184

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105 807 2236
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19.661 290 2886
19.762 007 7705

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.002 967 9966

.007 972 9970
.006 971 9969
.005 970 9968
.004 969 9967
.003 968 9966

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Fig. 2

ANNUALLY
If compounded
annually
nominal annual rate is

4 1/2%

Fig. 3

ANNUALLY
If compounded
quarterly
nominal annual rate is

9%

Fig. 4

ANNUALLY
If compounded
monthly
nominal annual rate is

18%

Fig. 1

MONTHLY
If compounded
monthly
nominal annual rate is

54%

(1+i) - 1

$v = \frac{1}{(1+i)^n}$

$a_{\frac{1}{i}} = \frac{1-v^n}{i}$

$\frac{1}{a_{\frac{1}{i}}} = \frac{i}{1-v^n}$

n

655

XERO
COPY

XERO
COPY

XERO
COPY

X
C